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from the breaking of post hydrants by auto trucks have caused a change to be made in the type of post hydrant, which up to date has opened with the pressure. The compression type hydrant opening against the pressure is to be substituted, and it is expected that the use of the flush hydrants will not be extended. Moving the hydrants from the curb line back to the building line is another possibility. The continuance of hydrants in their present location and adding to the cost of maintenance the replacement of hydrant stand pipes when broken, is the answer which will probably be adopted by the majority of water-works superintendents. This cost is materially reduced if the stand pipes are repaired by welding, which can be done successfully with modern machinery at a cost of from $6 to $8 per stand pipe.

The subject is one of such general interest, and offers such opportunity for fruitful discussion, that a prominent place is to be assigned to it at the Round Table portion of the program for the coming convention at Buffalo. The outcome of such discussion should be very helpful to the water works fraternity.

W. W. Brush.

LAYING WATER MAINS IN ALLEYS

The plan of laying water mains, gas mains, sewers, steam mains, telephone conduits and all other underground structures, used for the service of the public, in the alleys instead of in the streets is frequently advocated and sometimes tried.

The principal reason given by advocates of the plan is that by laying mains in alleys the streets will be opened less frequently and consequently pavements will be less often disturbed. This is a very good reason, for we will all agree that it is seemingly impossible to replace pavements so as to avoid bumps and holes. It can be done by skillful and conscientious workmen, in the case of first-class pavements, although the poorer the class of pavement the more difficult the job of replacement. The laying of conduits in alleys for light, power, telephone and telegraph lines, is frequently adopted and seems to be practicable in certain districts. Sanitary sewers might often be laid in alleys, but where combined or storm-water sewers are required the difficulty increases because catch-basins must be provided at street intersections.

Of course it is true that nowadays alleys are paved as well as streets, and that there is as much difficulty about replacing a pavement in an alley as in a street, but alleys are not used for fast driving so much as are streets and the scars made by excavations would not be so prominent in alleys as in streets. The principal objection to the alley is that it is not wide enough to accommodate all the underground work and that alleys, as usually laid out, are not continuous and usually run in one direction only. Gas mains and water mains, but especially water mains, must be laid as a gridiron, crossing frequently at right angles, and this is seldom possible if alleys are used exclusively.

Water mains supply fire hydrants which are necessary and are usually and properly located at street intersections. As an example: The commercial district of Davenport is covered by a perfect gridiron of good-size mains. All the alleys in this district run east and west. If the mains were laid in these alleys the north and south mains would have to be laid in streets. In such case hydrants at street intersections would be on one main only while alley hydrants, which are less numerous, would be near intersecting mains. Hydrants are also required half way between street intersections on east and west streets as well as north and south streets, and if mains were laid in alleys these hydrants would have to be eliminated in some cities as there would be no space in which to set them in 20-foot alleys.

A few years ago the writer tried to lay a small water main in an alley because it was desirable to avoid cutting a new pavement. There were several conduits in this alley used by telephone, telegraph and electric power companies and at the entrance of the alley were three manholes of considerable size. The water pipe could not be laid between the manholes because they overlapped. It could not be laid through them because the companies owning them objected and it could not be laid under them because the ground was solid rock and blasting would disturb the conduit system. The new pavement was cut and the pipe was not laid in the alley.

Gas and water services require shut-off cocks and curb boxes for outside control, and these are best located on sidewalks if they are to be accessible when needed. Curb boxes should always be located on public property. When located in alleys heavy vehicles are liable to pass over and break them. It is not desirable to place a curb box at any point where it may be covered up by ash barrels, manure boxes, or other material. When locating a meter in a commercial district the front entrance to a building is superior to the rear entrance in most cases.

In existing residential districts the same objection above mentioned regarding the width of alleys and that they usually run in one direction only, and not continuously, applies. In new additions provision for laying mains in alleys could be made so long as one policy prevailed, but then mains running at right angles to the prevailing direction of the alleys would have to be laid in streets. When blocks are 500 to 800 feet between cross streets sufficient hydrants would not be possible for proper protection, conveniently located, when mains were in alleys.

In two cases the plan of laying water mains in alleys has been tried in new additions in Davenport. In one case, a high-class residence district, private rights-of-way had to be provided for hydrant branches and for some mains, in order to complete the layout. One eight-inch main in this district now lies very deep under a brick wall and other expensive improvements in the yards of fine houses. The alley was vacated in this case. Parts of the district were platted without alleys and mains were laid in the streets, necessarily. In another district, houses were built facing, and on each side of, a wide boulevard. The water mains were laid in the alleys behind each row of houses. This plan worked all right until houses were built on the far side of the next parallel street when mains had to be provided for them. There being no alley, the main was laid in the street and we now have parallel mains one half block apart.

In one Iowa city the principal main was laid through the alleys in the commercial district. Fire hydrants located at street intersections were supplied from this main by long branches of smaller pipe. These long hydrant branches added to the expense of the system, added to the loss of head between the main and the hydrant, and there being no flow in the pipe between the main and the hydrant the danger of freezing would naturally be greater than in a normal installation.

The writer is willing to concede that the alleys could be utilized for some utilities, probably wiring and sanitary sewers, but contends that water mains, for reasons applying to safety and economy, had best be laid in the streets.

C. R. HENDERSON.